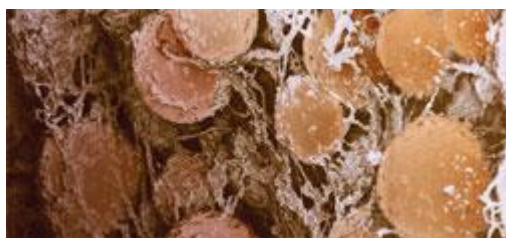


LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Sept. 26-30, 2011.



FAT TURNOVER IN OBESE SLOWER THAN AVERAGE



This scanning electron micrograph image shows part of a lobule of adipose tissue (body fat). Adipose tissue is specialized connective tissue that functions as the major storage site for fat. *Photo courtesy of David Gregory & Debbie Marshall/Wellcome Images*

It may be more difficult for obese people to lose fat because the "turnover" rate is much slower for overweight rather than average weight individuals.

New research shows that the turn over (storage and loss rate) of fat in the human body is about one and one half years compared to fat cells, which turnover about every 10 years, according to Lab researcher Bruce Buchholz and one of the authors of a new report in the journal, *Nature*.

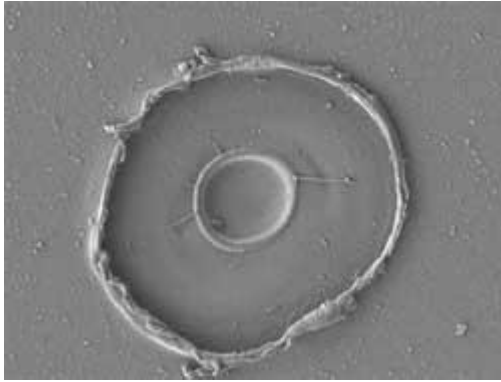
And while the turnover rate of fat is on average one and one half years for normal weight people, the news is worse for the obese -- the fat removal rate from fat tissue decreases and the amount of fat stored each year increases. In contrast, fat storage and removal rates balance in non-obese people for no net increase in fat.

"There is a slower output of fat in obese people in this study," Buchholz said. "The fat is on average 2 years old compared to one and one half years."

To read more, go to the [Web](#).



YOU CAN CALL ME AL



An electron micrograph image of a "crater" in an aluminum sample after it is shocked and compressed.

Using acceleration 1 trillion times faster than a jet fighter in a maximum turn, researchers have gained new insight into dynamic compression of aluminum (Al) at ultra-high strain rates.

Controlled shock compression has been used for decades to examine the behavior of materials under extreme conditions of pressure and temperature.

Using an ultra-fast spectroscopic technique (used to track shocks on a time scale of ten trillionths of a second), Laboratory scientists Jonathan Crowhurst, Michael Armstrong, Kim Knight, Joseph Zaugg and Elaine Behymer measured breakouts (driven by laser-induced shocks) in aluminum thin films with accelerations in the range of 10 trillion g's.

To read more, go to the [Web](#).



THE FUTURE OF HIGH PERFORMANCE COMPUTING



Greg Bronevetsky

Laboratory computer scientist Greg Bronevetsky has been named a recipient of a Presidential Early Career Award for Scientists and Engineers for helping advance state-of-the-art high performance computing, the White House announced this week.

The Presidential Early Career Awards for Scientists and Engineers, or PECASE, is the highest honor bestowed by the United States government on science and engineering professionals in the early stages of their independent research careers. Bronevetsky was one of 94 early career scientists and engineers to be recognized this year.

"To receive such recognition at this stage of my career is a great honor," Bronevetsky said. "This award is especially gratifying as it not only recognizes scientific achievement, but also the importance of this research to the nation."

Bronevetsky has dedicated his early scientific career to ensuring that the increasing power, size and complexity of the supercomputers critical to national security research and scientific discovery do not come at the expense of reliability.

To read more, go to the [Web](#).



MAKING A BETTER WING



The laser peening process is used to make stronger airplane wings. Credit: Metal Improvement

When Boeing's first 747-8 Freighter is delivered it will be lifted into flight on wings shaped and made stronger by laser shot peening.

The process grew out of Star Wars-era research by the Defense Advanced Research Projects Agency and, over the past decade, has found its way into aviation, most prominently in engines and airframes for combat aircraft. But it is beginning to play a role in commercial aircraft. By mitigating fatigue, laser peening extends the time between required inspections.

Slowly, laser peening is working its way into airframe manufacturing, which is where the newest 747 comes in.

In 2008, Boeing turned to Curtiss-Wright's Metals Improvement Co. (MIC). MIC's ability to impart precise, deep compressive stresses into the wing's aluminum alloy skins is being used to give the wing its complex curvature.

MIC grew out of laser fusion research for the National Ignition Facility at the Laboratory, which uses lasers to generate X-rays for nuclear fusion.

To read more, go to the [Web](#).



GIVING BACK TO THE COMMUNITY



Laboratory Deputy Director Thomas Gioconda spoke to the recipients of this year's LLNS Community Gift Giving Program and thanked them for their work.

Lawrence Livermore National Security, LLC (LLNS), the contract manager for the Laboratory, has announced the recipients for the 2011 LLNS Community Gift Program. These gifts, totaling \$100,000, reflect LLNS' commitment to local communities.

LLNS received 59 applications totaling more than \$600,000 in requests. Twenty-two applications were selected for awards through a committee review process. The majority of these awards serve children in the Tri-Valley and San Joaquin County, with a focus on science, math education and cultural arts.

"We appreciate the efforts of the agencies and want to thank them for the invaluable contributions they provide in our Tri-Valley community," said George Miller, LLNS president and Lab director. "It is the privilege of LLNS to be able to contribute to these worthwhile efforts, especially given the impact these gifts will have on education and arts programs within our community."

To see a full list of the recipients, go to the [Web](#).

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send [e-mail](#).

The Livermore Lab Report [archive](#) is available on the Web.